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| 09/827,280      | 04/05/2001  | Cecilia Brandel      | 47253-00004         | 6620             |

7590 01/20/2004

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| EXAMINER |
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HARPER, V PAUL

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| ART UNIT | PAPER NUMBER |
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2654

DATE MAILED: 01/20/2004

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Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/827,280

Applicant(s)

BRANDEL ET AL.

Examiner

V. Paul Harper

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 03 November 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

***Claim Objections***

1. All relevant objections have been satisfied.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 2, 4-6, 8, 9, and 11-13 are rejected under 35 U.S.C. 102(b) as being anticipated by Krubsack et al. ("An Autocorrelation Pitch Detector and Voicing Decision with Confidence Measures Developed for Noise-Corrupted Speech," IEEE Transactions on Signal Processing, Vol. 39, No. 2, Feb. 1991), hereinafter referred to as Krubsack.

Regarding claims 1 and 8, Krubsack teaches a method for autocorrelation pitch detection using the following steps:

- dividing the speech signal into segments (p. 320, § "A. Pitch Detector," 1<sup>st</sup> paragraph);
- calculating for each segment a conformity function for the signal (p. 320, § "A. Pitch Detector," 1<sup>st</sup> paragraph, i.e., applying the autocorrelation function);

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- detecting peaks in the conformity function (p. 320, column 2, 2<sup>nd</sup> paragraph, picking the peaks)
- estimating an average distance between said peaks (p. 320, column 2,  $F_0$  is calculated as an average period length);
- using the estimate of said average distance as an estimate of the pitch (p. 320, column 2).

Regarding claims 2 and 9, Krubsack teaches everything claimed, as applied above (see claims 1, and 8, respectively). In addition, Krubsack teaches:

- sampling the speech signal to obtain a series of samples (p. 320, § "A. Pitch Detector," 1<sup>st</sup> paragraph);
- performing said division into segments such that each segment has a fixed number of consecutive samples (p. 3, § "A. Pitch Detector," 1<sup>st</sup> paragraph, using successive 51.2 ms speech segments).

Regarding claims 4 and 11, Krubsack teaches everything claimed, as applied above (see claims 1 and 8, respectively). In addition, Krubsack teaches:

- said conformity function is calculated as an autocorrelation function (p. 320, § "A. Pitch Detector," 1<sup>st</sup> paragraph).

Regarding claims 5 and 12, Krubsack teaches everything claimed, as applied above (see claims 1 and 8, respectively). In addition, Krubsack teaches:

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- calculating for each peak in the conformity function the difference between the position of the peak and the estimate of said average distance (p. 320, column 2, equation 3);
- providing an estimate of the pitch by selecting as the improved estimate the position of the peak having the smallest value of said difference (p. 320, column 2, equation 3 and following text).

Regarding claims 6 and 13, Krubsack teaches everything claimed, as applied above (see claims 5 and 13). In addition, Krubsack teaches:

- selecting, if the peak having the smallest value of said difference is represented by a number of samples, the sample having the maximum amplitude of said conformity function as said improved estimate of the pitch (p. 320, column 2, in particular ¶¶3, peak size).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 3 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Krubsack in view of Rabiner et al. ("Digital Processing of Speech Signals," Prentice-Hall, 1978), hereinafter referred to as Rabiner.

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Regarding claims 3 and 10, Krubsack does not specifically teach: "estimating a set of filter parameters using linear predictive analysis, providing a modified signal by filtering the speech signal through a filter based on said estimated set of filter parameters, and calculating said conformity function of the modified signal." However, the examiner contends that this concept was well known in the art, as taught by Rabiner.

In the same field of endeavor, Rabiner teaches a technique for pitch detection using LPC parameters with the steps of estimating filter coefficients, filtering and autocorrelation (Fig. 8.25, §8.10.1, in particular the first two paragraphs).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Krubsack by specifically providing the method, as taught by Rabiner, since the resulting filtering flattens the spectrum (p. 448, 1<sup>st</sup> paragraph) improving the results.

4. Claims 7, 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Krubsack in view of well known prior art (MPEP 2144.03).

Regarding claims 7 and 14, Krubsack does not specifically teach that "said method is used in a mobile telephone." However, the examiner takes official notice of the fact that the use of pitch extraction techniques in a mobile telephone for the processing of speech was well known in the art.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Krubsack such that the pitch detection

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technique was applied to mobile telephones, since improved pitch extraction can be used to improve the speech processing techniques used in mobile phones.

Regarding claim 15, Krubsack does not specifically teach "the device is an integrated circuit." However, the examiner takes official notice of the fact the implementation of signal processing algorithms on integrated circuits was well known in the art.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Krubsack such that the pitch detection technique was implemented in an integrated circuit, since implementation of the algorithm in hardware can improve performance.

### ***Response to Arguments***

5. Applicant's arguments with respect to claims 1-15 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

Any response to this office action should be mailed to:

Commissioner of Patents and Trademarks  
P.O. Box 1450  
Alexandria, VA 22313-1450

or faxed to:

(703) 872-9314

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Hand-delivered responses should be brought to:

Crystal Park II  
2121 Crystal Drive  
Arlington, VA.  
Sixth Floor (Receptionist)

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. V. Paul Harper whose telephone number is (703) 305-4197. The examiner can normally be reached on Monday through Friday from 8:00 a.m. to 4:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richemond Dorvil, can be reached on (703) 305-9645. The fax phone number for the Technology Center 2600 is (703) 872-9314.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service office whose telephone number is (703) 306-0377.

VPH/vph  
January 6, 2004



**RICHEMOND DORVIL**  
SUPERVISOR, PATENT EXAMINER